

Sayh al Uhaymir 300

Polymict impact melt breccia

152.6 g



Figure 1: Sayh al Uhaymir 300 in the desert in Oman (photo by R.. Bartoschewitz).

Introduction

Sayh al Uhaymir 300 (Fig. 1) was found in February 2004 in the Oman desert (Fig. 2). It is an olive-green flat and rounded rock with a resinous luster that may be due to desert weathering, since it has no fusion crust. The interior of the sample reveals a medium grey brecciated matrix with lighter clasts, metal flakes, and small vesicles (Russell et al., 2005; Bartoschewitz et al., 2005a). Some terrestrial alteration is present as white crystals in fractures - calcite and gypsum.

Petrography and mineralogy

Clasts within the breccia include troctolite, anorthositic olivine gabbro, olivine gabbro, anorthosite, wehrlite, dunite, clinopyroxenite, and gabbro. These rock types exhibit hypidiomorphic-granular, subophitic, poikilitic, and granular textures. Plagioclase feldspar is anorthitic with An_{95-96} , and olivine varies from Fa_{15} to Fa_{39} . Accessory minerals are kamacite, chromite, spinel, ulvöspinel, ilmenite, armalcolite, and troilite. Feldspathic glass is also present, with 24 wt% Al_2O_3 , 7.4 wt% FeO and 4.7 wt% MgO. Like many other feldspathic breccia lunar meteorites, the plagioclase (An) and

pyroxene (Mg#) compositions bridge the gap between the FAN and HMS fields (Hsu et al., 2007).

Petrographic studies have generally come to two different conclusions regarding this lunar meteorite. Initially the presence of clasts with basaltic affinity, as well as its intermediate bulk compositional properties (FeO and Al_2O_3) led some to call it a basalt-bearing feldspathic breccia (Hsu et al., 2006, 2007; Bartoschewitz et al., 2005a). However, additional studies of textures and bulk composition have led some to call it a polymict impact melt breccia, based on the abundance of impact melts, impact melt breccias, and the consistently high siderophile element concentrations (Huggins et al., 2007). The latter evidence is strong enough to persuade this writer that it should be called a polymict impact melt breccia.

Chemistry

Bulk compositional features include intermediate composition between basaltic and feldspathic end members, with 20 to 24 wt% Al_2O_3 , 18-22 ppm Sc, 0.26 to 0.27 wt% TiO_2 and 0.46 ppm Th (Bartoschewitz et al., 2005b). Rare earth elements have been measured in mineral phases from some of the clasts and show an overall similarity to other lunar highlands breccias (Hsu et al., 2006, 2007). However, the lower Th and dearth of KREEP clasts has suggested a far side highlands terrane origin (Hsu et al., 2007). Siderophile elements (Co, Ni, Au and Ir) are in general very high for this sample (Bartoschewitz et al., 2005b). Noble gases are low in this meteorite, and may have been driven off during metamorphism to granulite grade (Bartoschewitz et al., 2005c), although there is a small amount of some noble gas isotopes due to cosmogenic production in the lunar regolith.

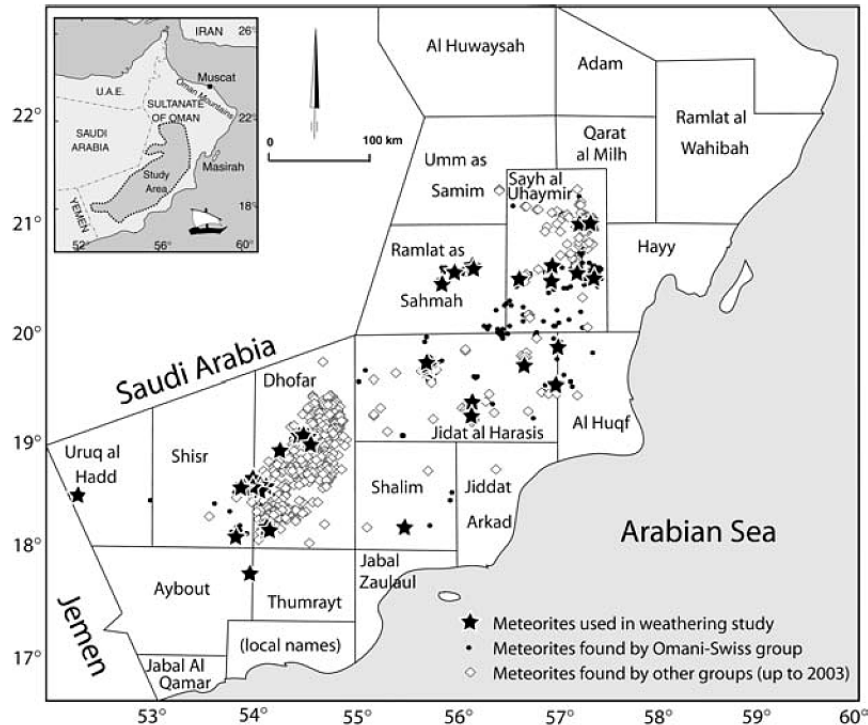


Figure 2: Map of Oman, showing the Sayh al Uhaymir region just NE of center (from Al-Kathiri et al., 2005).